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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
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10/724,009

11/26/2003

Jurgen Lindolf

INFN/0040

7545

46798

7590

03/29/2005

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EXAMINER

HO, TU TU V

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EX

|                              |                               |                               |  |
|------------------------------|-------------------------------|-------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/724,009 | Applicant(s)<br>LINDOLF ET AL |  |
|                              | Examiner<br>Tu-Tu Ho          | Art Unit<br>2818              |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9 and 21-26 is/are allowed.
- 6) ☒ Claim(s) 10-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102 and/or § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

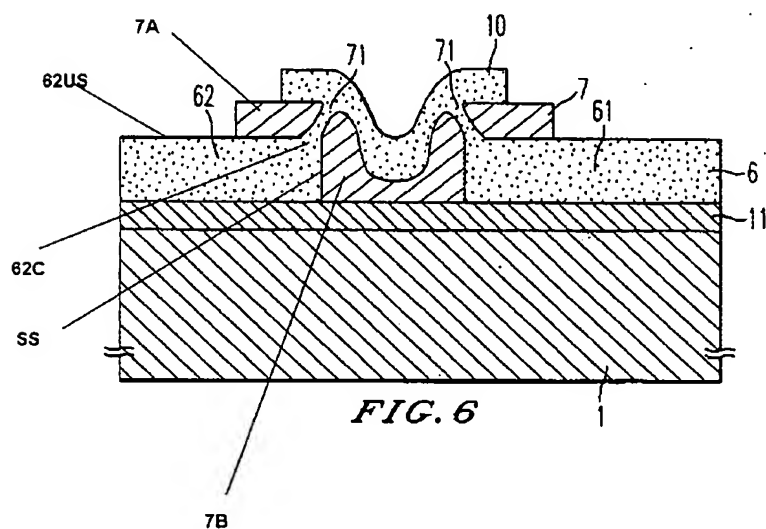
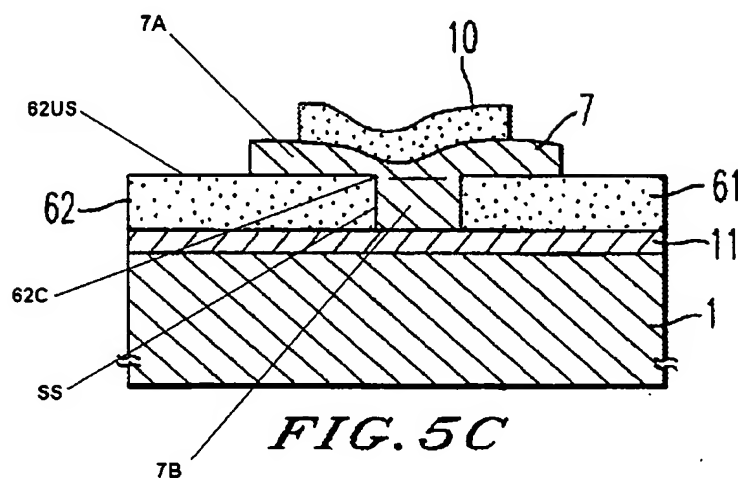
2. **Claims 10-20** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Takagi et al. U.S. Patent 5,625,219.

Takagi discloses in Figures 1-6 and respective portions of the specification an antifuse and an inherent method of using the antifuse as claimed or substantially as claimed depending on how broad one in the art interprets “region” and “layer”.

Specifically, Takagi discloses a single region 7 that is functionally equivalent to the nonconductive region 2 and the dielectric layer 4 of the present invention. More specifically and with reference to Figs. 5C and 6, with added reference characters as depicted on the following page for ease of explanation, and referring to **claims 10, 13, and 14**, Takagi discloses an antifuse, comprising:

a first conductive region (62), the first conductive region defining a first upper surface (62US) and a first lateral boundary surface (SS) which meet at an angle (62C) to form an edge;

a nonconductive region (7B) adjoining the first conductive region (62), the nonconductive region defining a second upper surface and a second lateral boundary surface (SS); wherein the first and second lateral boundary surfaces are in facing relationship and form an interface (generally indicated as SS);



a dielectric layer (7A) disposed over at least a portion of the first upper surface (62US) of the first conductive region and at least a portion of the edge (62C), whereby an area of relatively increased field strength is produced during application of a programming voltage to form a breakdown channel (71) in the dielectric layer; and a second conductive region (10) on the dielectric layer.

Referring to **claims 11 and 15**, Takagi further discloses that the conductive region (62) defines a corner (62C) and wherein forming the dielectric layer (7A) comprises forming the dielectric layer over the corner. Referring to the limitation “area of relatively increased field strength” of claim 11, the area of relatively increased field strength results in the breakdown of the dielectric layer 7A at the corner and the eventual forming of the path 71).

Referring to **claims 12 and 17**, Takagi further discloses that the dielectric layer (7A) is disposed over at least a portion of the nonconductive region (7B, best seen in Fig. 5C).

Referring to **claim 16**, Takagi further discloses that the first conductive region (62) and the nonconductive region (7B) form a substantially planar upper surface which interfaces with a lower surface of the dielectric layer (7A, best seen in Fig. 5C).

Referring to **claims 18-20**, Takagi further discloses that the nonconductive region (7B) comprises SiN and the dielectric layer (7A) comprises SiN (column 6, lines 61-63).

3. Applicant’s arguments with respect to claims 10-20 and to the Takagi reference, filed 02/17/2005, have been fully considered but they are not persuasive.

4. In response to applicant's argument that the reference fails to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., conductive layer (62) and nonconductive layer (7B) are formed *on* the substrate and not *in* the substrate) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

*Allowable Subject Matter*

5. Claims 1-9 and 21-26 are allowable over the prior art of record.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to teach or render obvious a method for producing an antifuse structure having *all* (respectively) exclusive limitations as recited in claims 1 and 21, characterized in that the conductive region and the non conductive region are formed in the substrate, and in that the dielectric layer is formed over the first and second upper surfaces.

*Conclusion*

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tu-Tu Ho  
March 23, 2005



David Nelms  
Supervisory Patent Examiner  
Technology Center 2800